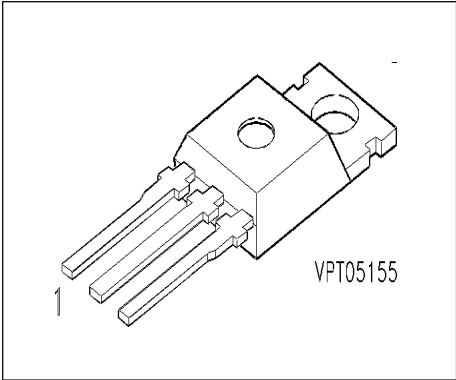


SIPMOS® Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- Logic Level
- dv/dt rated
- Low on-resistance
- 175 °C operating temperature
- also in TO-220 SMD available



| Pin 1 | Pin 2 | Pin 3 |
|-------|-------|-------|
| G | D | S |

| Type | V_{DS} | I_D | $R_{DS(on)}$ | Package | Ordering Code |
|----------|----------|-------|---------------|-----------|-----------------|
| BUZ 101L | 50 V | 29 A | 0.06 Ω | TO-220 AB | C67078-S1355-A2 |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|--|-------------|----------|-------------------|
| Continuous drain current $T_C = 31\text{ }^{\circ}\text{C}$ | I_D | 29 | A |
| Pulsed drain current $T_C = 25\text{ }^{\circ}\text{C}$ | I_{Dpuls} | 116 | |
| Avalanche energy, single pulse $I_D = 29\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\text{ }\Omega$ $L = 83\text{ }\mu\text{H}$, $T_j = 25\text{ }^{\circ}\text{C}$ | E_{AS} | 70 | mJ |
| Reverse diode dv/dt $I_S = 29\text{ A}$, $V_{DS} = 40\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$ $T_{jmax} = 175\text{ }^{\circ}\text{C}$ | dv/dt | 6 | kV/ μs |
| Gate source voltage | V_{GS} | ± 14 | V |
| Gate-source peak voltage,aperiodic | V_{gs} | ± 20 | |
| Power dissipation $T_C = 25\text{ }^{\circ}\text{C}$ | P_{tot} | 100 | W |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|-------------------------------------|------------|---------------|------|
| Operating temperature | T_j | -55 ... + 175 | °C |
| Storage temperature | T_{stg} | -55 ... + 175 | |
| Thermal resistance, chip case | R_{thJC} | ≤ 1.5 | K/W |
| Thermal resistance, chip to ambient | R_{thJA} | ≤ 75 | |
| DIN humidity category, DIN 40 040 | | E | |
| IEC climatic category, DIN IEC 68-1 | | 55 / 175 / 56 | |

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Static Characteristics

| | | | | | |
|---|---------------|-----|-------|------|----|
| Drain- source breakdown voltage $V_{GS} = 0 \text{ V}$, $I_D = 0.25 \text{ mA}$, $T_j = -40^\circ\text{C}$ | $V_{(BR)DSS}$ | 50 | - | - | V |
| Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1 \text{ mA}$ | $V_{GS(th)}$ | 1.2 | 1.6 | 2 | |
| Zero gate voltage drain current $V_{DS} = 50 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_j = 25^\circ\text{C}$ | I_{DSS} | - | 0.1 | 1 | μA |
| $V_{DS} = 50 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_j = -40^\circ\text{C}$ | | - | 1 | 100 | nA |
| $V_{DS} = 50 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_j = 150^\circ\text{C}$ | | - | 10 | 100 | μA |
| Gate-source leakage current $V_{GS} = 20 \text{ V}$, $V_{DS} = 0 \text{ V}$ | I_{GSS} | - | 10 | 100 | nA |
| Drain-Source on-resistance $V_{GS} = 5 \text{ V}$, $I_D = 14.5 \text{ A}$ | $R_{DS(on)}$ | - | 0.045 | 0.06 | Ω |

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Dynamic Characteristics

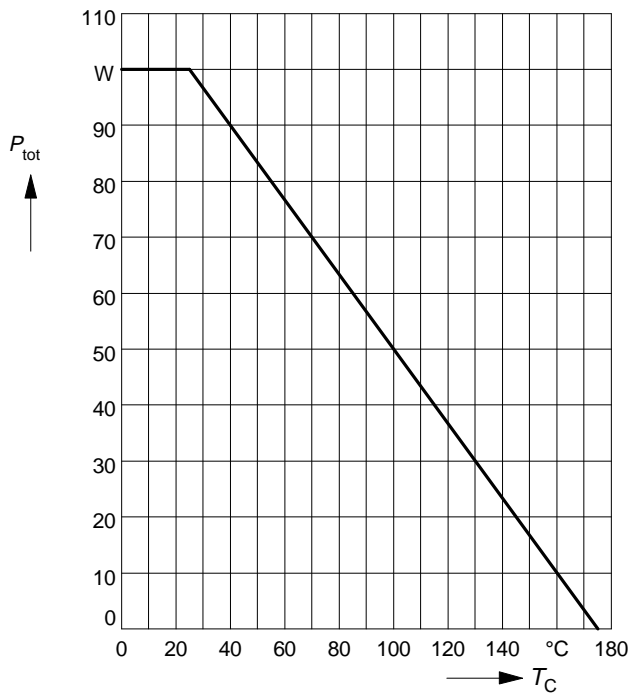
| | | | | | |
|---|--------------|---|-----|-----|----|
| Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 14.5 \text{ A}$ | g_{fs} | 7 | 17 | - | S |
| Input capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$ | C_{iss} | - | 720 | 960 | pF |
| Output capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$ | C_{oss} | - | 220 | 330 | |
| Reverse transfer capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$ | C_{rss} | - | 100 | 150 | |
| Turn-on delay time $V_{DD} = 30 \text{ V}$, $V_{GS} = 5 \text{ V}$, $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$ | $t_{d(on)}$ | - | 25 | 40 | ns |
| Rise time $V_{DD} = 30 \text{ V}$, $V_{GS} = 5 \text{ V}$, $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$ | t_r | - | 95 | 140 | |
| Turn-off delay time $V_{DD} = 30 \text{ V}$, $V_{GS} = 5 \text{ V}$, $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$ | $t_{d(off)}$ | - | 140 | 190 | |
| Fall time $V_{DD} = 30 \text{ V}$, $V_{GS} = 5 \text{ V}$, $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$ | t_f | - | 85 | 115 | |

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|----------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| Reverse Diode | | | | | |
| Inverse diode continuous forward current $T_C = 25\text{ }^{\circ}\text{C}$ | I_S | - | - | 29 | A |
| Inverse diode direct current,pulsed $T_C = 25\text{ }^{\circ}\text{C}$ | I_{SM} | - | - | 116 | |
| Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = 58\text{ A}$ | V_{SD} | - | 1.2 | 2 | V |
| Reverse recovery time $V_R = 30\text{ V}$, $I_F=I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$ | t_{rr} | - | 50 | - | ns |
| Reverse recovery charge $V_R = 30\text{ V}$, $I_F=I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$ | Q_{rr} | - | 70 | - | μC |

Power dissipation

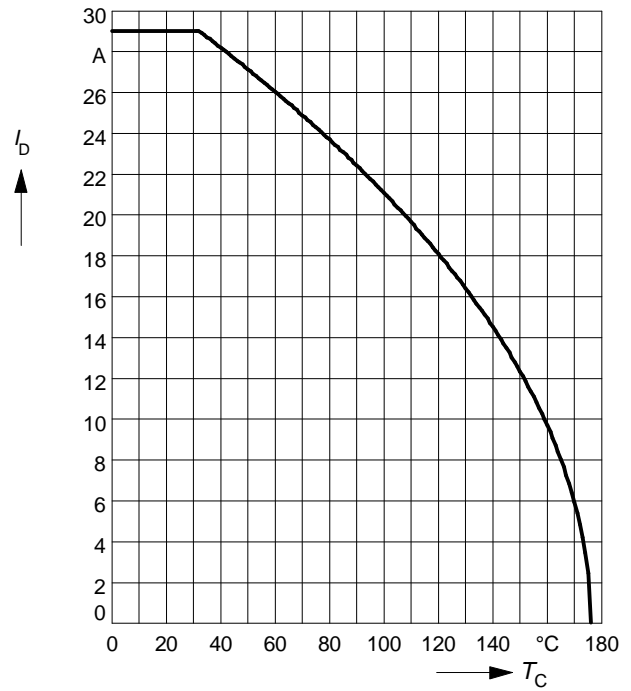
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

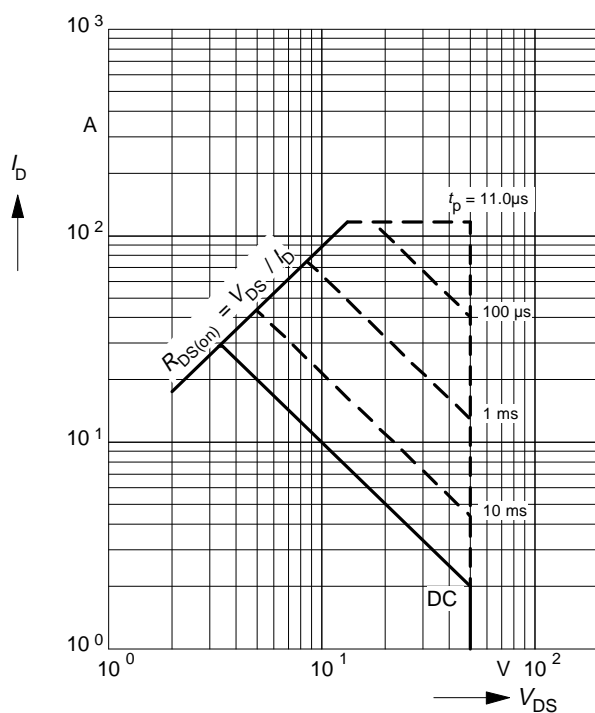
parameter: $V_{GS} \geq 5 \text{ V}$



Safe operating area

$$I_D = f(V_{DS})$$

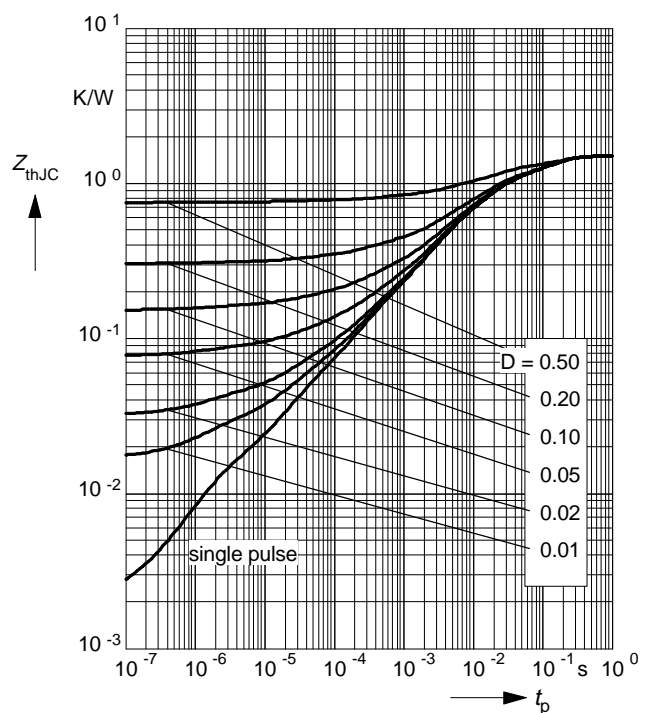
parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Transient thermal impedance

$$Z_{\text{th JC}} = f(t_p)$$

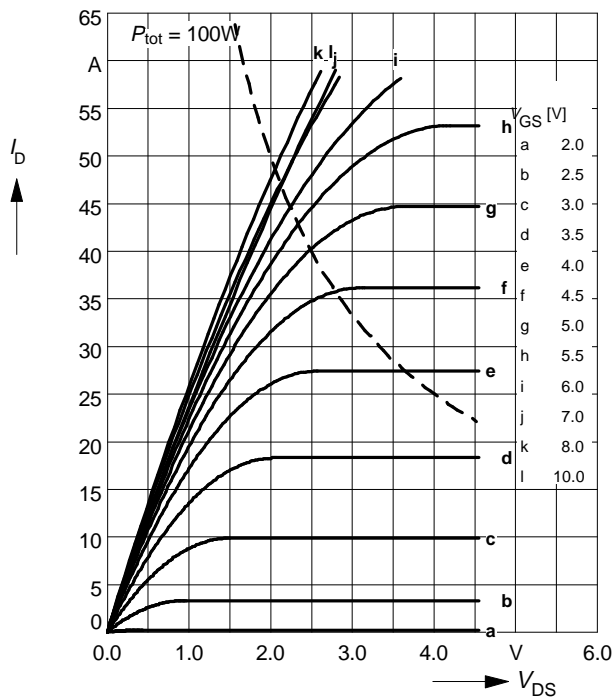
parameter: $D = t_p / T$



Typ. output characteristics

$$I_D = f(V_{DS})$$

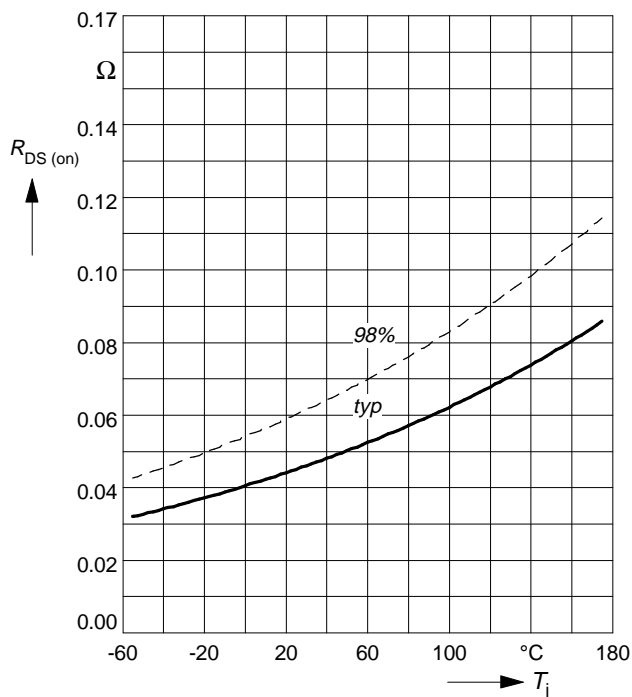
parameter: $t_p = 80 \mu s$



Drain-source on-resistance

$$R_{DS(on)} = f(T_j)$$

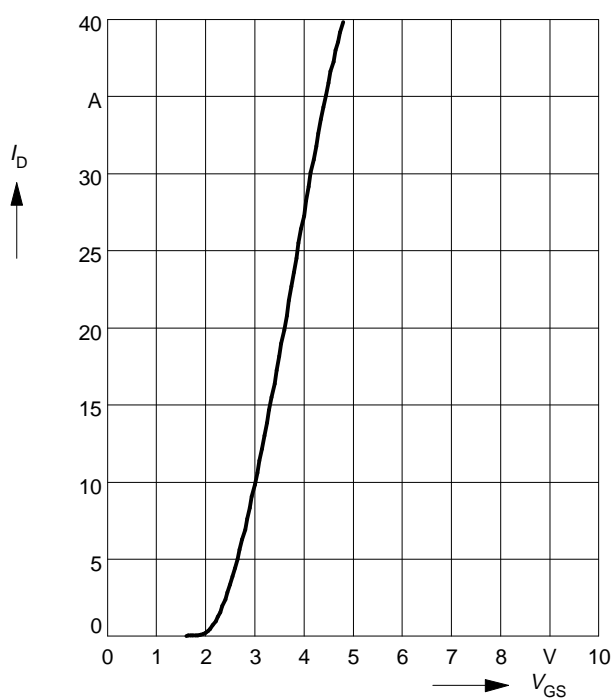
parameter: $I_D = 14.5 A$, $V_{GS} = 5 V$



Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p = 80 \mu s$

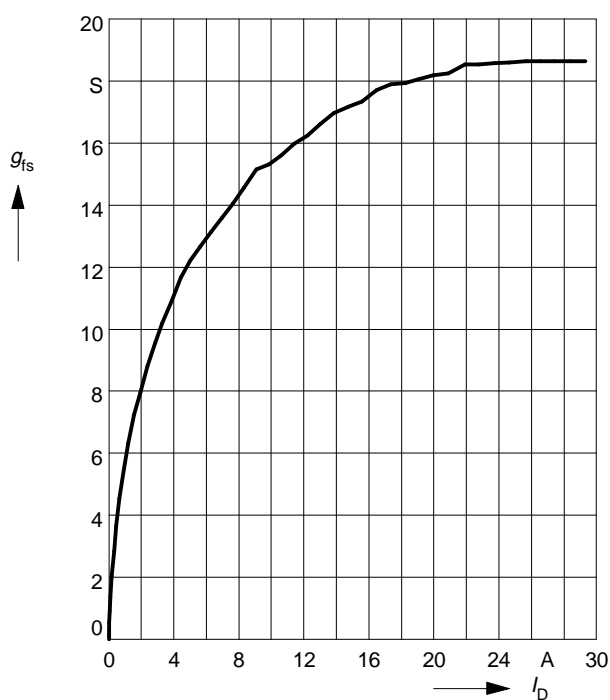
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80 \mu s$,

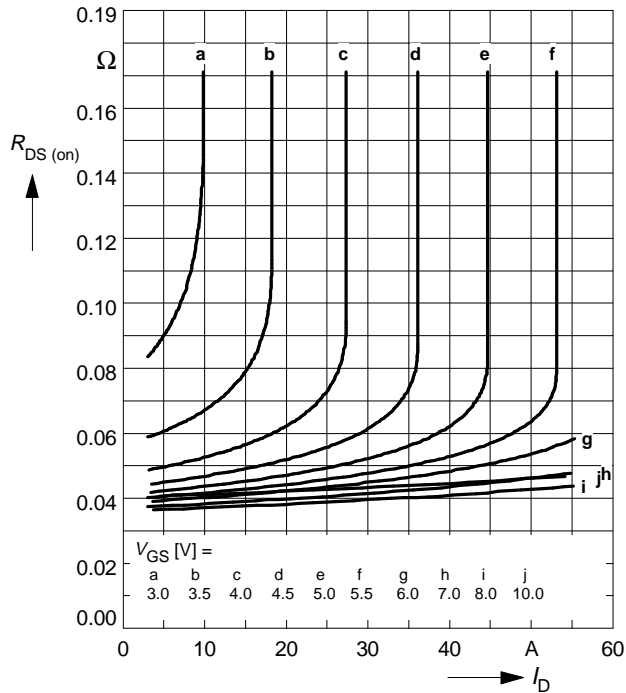
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. drain-source on-resistance

$$R_{DS(on)} = f(I_D)$$

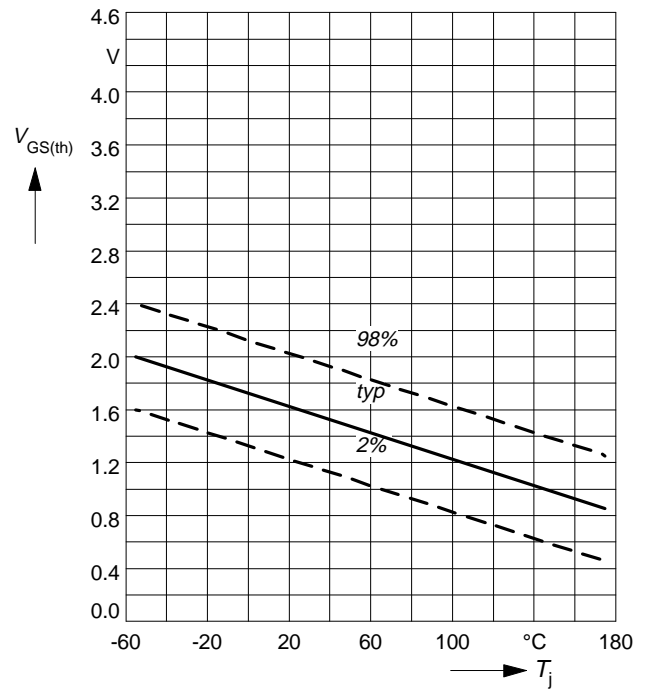
parameter: V_{GS}



Gate threshold voltage

$$V_{GS(th)} = f(T_j)$$

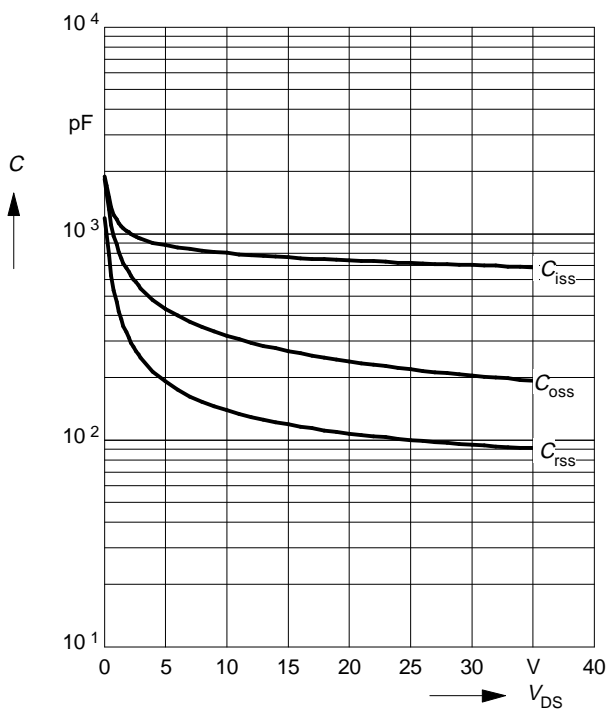
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA



Typ. capacitances

$$C = f(V_{DS})$$

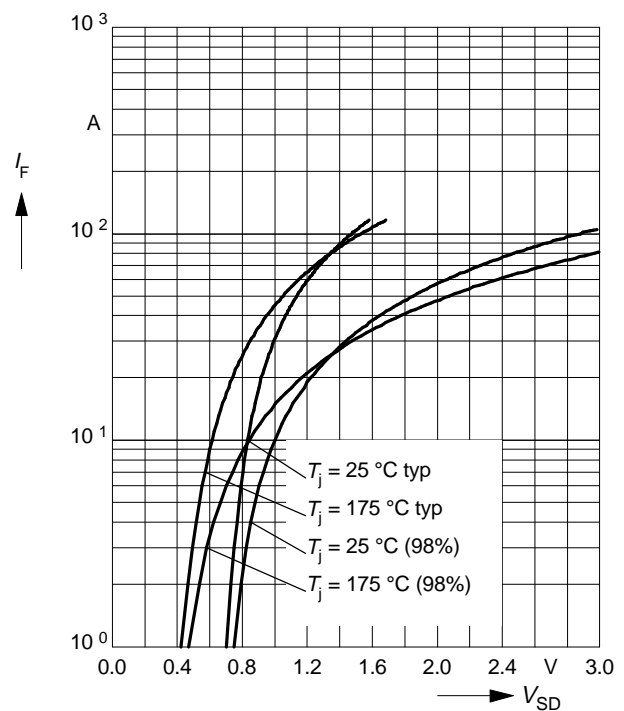
parameter: $V_{GS} = 0$ V, $f = 1$ MHz



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

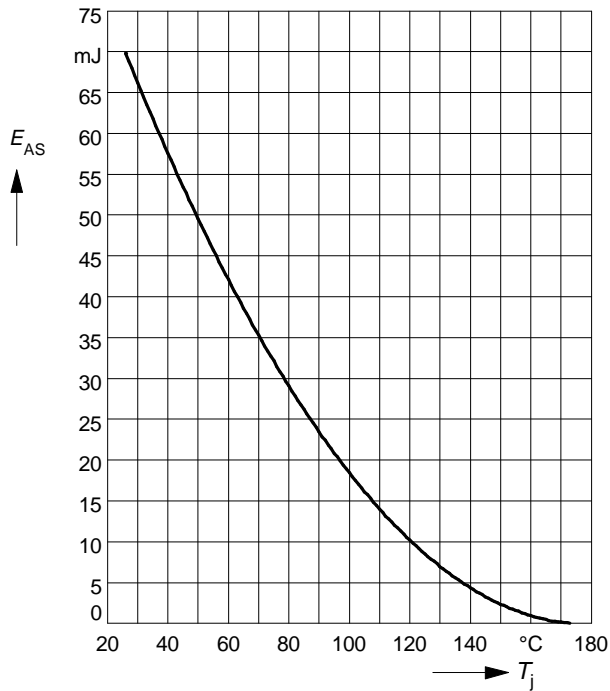
parameter: T_j , $t_p = 80$ μ s



Avalanche energy $E_{AS} = f(T_j)$

parameter: $I_D = 29 \text{ A}$, $V_{DD} = 25 \text{ V}$

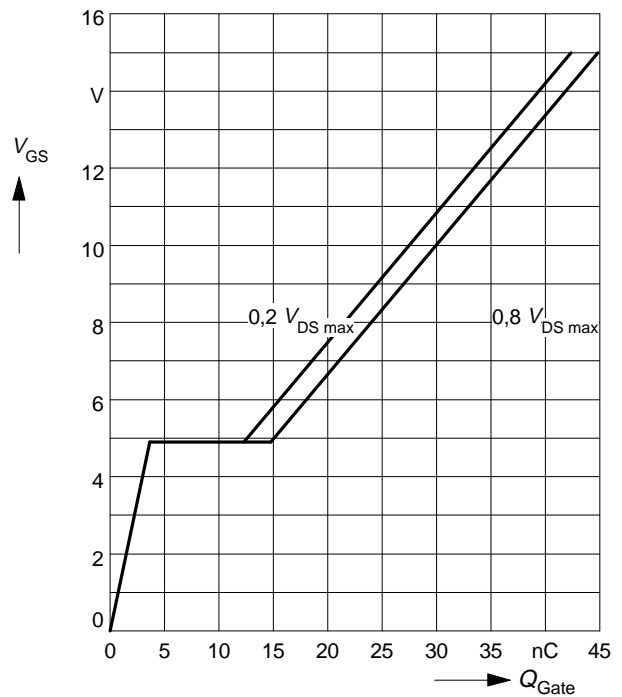
$R_{GS} = 25 \Omega$, $L = 83 \mu\text{H}$



Typ. gate charge

$V_{GS} = f(Q_{\text{Gate}})$

parameter: $I_{D \text{ puls}} = 44 \text{ A}$



Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$

